



Commonwealth of Massachusetts
Executive Office of Energy & Environmental Affairs

Department of Environmental Protection

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March 6, 2015

Mr. Peter Melnik
Barway Biogas, LLC
188 Mill Village Road
South Deerfield, MA 01342

RE: South Deerfield
Transmittal No.: X262954
Application No.: WE-14-025
Class: NM25
FMF No.: 561888
AIR QUALITY PLAN APPROVAL

Dear Mr. Melnik:

The Massachusetts Department of Environmental Protection ("MassDEP"), Bureau of Air and Waste, has reviewed your Non-major Comprehensive Plan Application ("Application") listed above. This Application concerns the proposed construction and operation of an anaerobic digester system to fuel a combined heat and power (CHP) generator set with an associated gas back-up flare at your dairy farm operation located at 188 Mill Village Road in South Deerfield, Massachusetts ("Facility"). The Application bears the seal and signature of Chantel L. Beliveau, Massachusetts Registered Professional Engineer Number 50741.

This Application was submitted in accordance with 310 CMR 7.02 Plan Approval and Emission Limitations as contained in 310 CMR 7.00 "Air Pollution Control" regulations adopted by MassDEP pursuant to the authority granted by Massachusetts General Laws, Chapter 111, Section 142 A-N, Chapter 21C, Section 4 and 6, and Chapter 21E, Section 6. MassDEP's review of your Application has been limited to air pollution control regulation compliance and does not relieve you of the obligation to comply with any other regulatory requirements.

MassDEP has determined that the Application is administratively and technically complete and that the Application is in conformance with the Air Pollution Control regulations and current air pollution control engineering practice, and hereby grants this **Plan Approval** for said Application, as submitted, subject to the conditions listed below.

Please review the entire Plan Approval, as it stipulates the conditions with which the Facility owner/operator ("Permittee") must comply in order for the Facility to be operated in compliance with this Plan Approval.

1. DESCRIPTION OF FACILITY AND APPLICATION

Barway Biogas LLC (Barway) is a biogas producer located at Barway Farm, a dairy operation in South Deerfield. Barway Farm has approximately 250 milking cows and 600 acres of land for crop production. There are no previous Plan Approvals for this facility. Barway Biogas has secured a contract to sell electricity through net metering to Western Mass Electric Company (now Eversource). Barway Biogas plans to install an anaerobic digester system to generate biogas which will be used to produce electricity and heat using a combined heat and power generator set (highly efficient lean burn engine).

Dairy manure produced at Barway Farm as well as off-farm feedstocks such as source separated organics (SSO) and dissolved air flotation (DAF) material from organic waste processing will be used to produce biogas. The anaerobic digester will not process any biosolid material. It is anticipated that the anaerobic digester will process approximately 11,000 tons of dairy manure per year and 25,500 tons of off-farm organic material per year.

The effluent from the digester (digestate) will be processed through a screw press to produce bedding material for use in the dairy barns. The remaining liquid digestate will be land applied as a nutrient-rich fertilizer at Barway Farm. Bedding will be covered and stored where conventional bedding is currently stored. The liquid digestate will be stored in Barway's two existing 1,000,000 gallon open air raw manure storage tanks until it is applied.

Pre-Digestion Processes

The dairy barn at Barway Farm is cleaned using an alley scraper, scraping manure into a covered concrete holding pit at the end of the barn. Several times per day, dairy manure will be pumped to the anaerobic digester from the holding pit. The manure in the holding pit will be periodically mixed to prevent the settling and packing of solids. The use of a holding pit is part of regular farm practices in Massachusetts and as such the odors associated from the use of this pit are a part of the normal farm practices at Barway Farm. This practice is covered under the *Massachusetts Right to Farm By-Law, Article 97 of the Articles of Amendment*.

Off farm feedstocks will be delivered to the digester site and stored in the 66,000 gallon receiving tank (hydrolyzer) until they are fed to the anaerobic digester. The hydrolyzer is designed to operate at 104°F in order to promote the hydrolysis of feedstocks in the tank. The receiving tank will be heated with heat produced from the CHP unit. Hydrolysis creates acid bacteria which help break down the feedstocks, creating volatile fatty acids and acetic acids which are then transferred to the anaerobic digester for use in creating biogas. Several times per day, material will be pumped via piping from the receiving tank into the anaerobic digester.

Trucks delivering off farm feedstocks will transfer the material to the receiving tank during regular business hours. Liquid deliveries will be pumped to the receiving tank via an air and

liquid tight tube and camlock with bar-screen while solid deliveries are transferred to the receiving tank via a chute which opens and closes for delivery of material. The receiving station will have wash-down equipment so that the delivery truck and delivery area can be cleaned (if required) after material is delivered. This wash water will be routed to the Receiving Tank to prevent odors.

Nuisance Odor Control for the Receiving Tank

When liquids or solids are to be added to the receiving tank, the operator will start a blower fan designed to pull 700 cubic feet per minute through a filter unit which will create a negative pressure within the tank. The proposed filter is a newterra model NT-DBS-700 CFM filter housing unit with a Filter Innovations Inc. GC IPH activated carbon pellet medium¹. This activated carbon pellet is impregnated with potassium hydroxide for the desulphurization of gases and the removal of acidic contaminants such as hydrogen sulfide (H₂S), hydrogen chloride, and mercaptans. The fan and filter have been sized to assure that the volume through the filter is eight times the sum of all displacement activities² on an averaged, hourly basis.

The filter will be monitored weekly for H₂S breakthrough at existing pre and post-filter sampling ports until the performance of the filter is determined. The filter will be monitored using a Draeger tube or an equivalent method approved by the MassDEP to determine whether breakthrough has occurred³. Replacement media will be kept on-site at all times to ensure continuous treatment of the displaced volume of gas.

Anaerobic Digester

A 396,000 gallon, mesophilic (104°F) completely mixed anaerobic digester will process all of the farm manure and the off-farm feedstocks, producing biogas and digestate. The tank will be made of concrete and will have a flexible membrane roof that will capture the biogas. The membrane will be essentially impermeable to the biogas.

In the anaerobic digester, methanogenic bacteria convert acids into biogas. On a daily basis, approximately 7,310 yd³ of biogas and 82 yd³ of digestate will be produced by the anaerobic digester. Biogas is typically about 60% methane and 40% carbon dioxide. At 60% methane content, biogas contains approximately 600 British thermal units per standard cubic feet of gas (BTU/scf).

The anaerobic digester will have an average retention time of 22 days. Like the receiving tank, the heat required for the process of anaerobic digestion will come from the CHP engine.

¹ Or equivalent as approved by MassDEP.

² This includes all tank filling activities and the generation of gas within the tank.

³ Breakthrough is considered to have occurred when the ratio of the concentration in the gas stream leaving the filter unit to the concentration in the feed is equal to 0.05 to 0.10.

The biogas will be cooled with a mechanical chiller and used for fuel in the 500 kW CHP engine.

Combined Heat and Power Generator Set

The proposed Dresser-Rand Guascor HGM 240 CHP engine has a maximum heat input capacity of 4.45MMBtu/hr and an electrical output capacity of 500 kW. The engine is capable of combusting approximately 150 standard cubic feet per minute at full capacity. Exit stack properties for the CHP engine are outlined in Table 7.

The exhaust gas will pass through a DCL America Inc. catalytic converter model MQL DC18-10 CC (or equivalent) that will reduce carbon monoxide emissions by a minimum of 90% (by weight). The CHP generator set will analyze biogas samples every 30 minutes for methane, carbon dioxide, oxygen and hydrogen sulfide content.

The CHP engine will be delivered in a perforated foam-lined container which will be installed within a 400 square foot closed building. The CHP engine will have components designed to mitigate noise pollution including an exhaust silencer and an upblast exhaust fan to direct sound upwards thereby producing a sound attenuating effect. To verify that these noise mitigation measures are effective, Barway will conduct a noise survey in accordance with MassDEP guidelines (Table 3, Provision 14).

Back-up Flare

The LSC Environmental Products, LLC CF-10 biogas flare will be used during start-up, down-time, and maintenance of the engine. It will also be used to reduce digester pressure in the event that the engine is insufficient and biogas cannot be temporarily stored in the digester membrane. Barway expects that the flare will be used for no more than 180 hours per year.

The flare is designed to flare 140 ft³/min of biogas, which is equivalent to the total expected biogas production. The design of the flare meets the specifications of 40 CFR 60.18, *General control device and work practice requirements* and so is expected to have a 98% VOC destruction efficiency. Flare specifications are listed in Table 1.

The selected flare is battery powered with solar chargers and electronic ignition and therefore will operate regardless of power outages. A thermocouple will monitor the presence of a flame when biogas is routed to it. The thermocouple will be connected to a supervisory control and data acquisition (SCADA) system to monitor and record the operation parameters as well as send an alarm if a flame is not detected while biogas is being routed to the back-up flare.

High Pressure Conditions

At standard operating conditions the operating pressure in the anaerobic digester will typically be 2" of water column at 104°F. If the digester reaches 4" of water column, the back-up flare will engage to flare excess biogas until the pressure drops below 4" of water column.

Should the digester pressure increase to 5" of water column, the operator of the digester will receive a high pressure audible alarm warning. If the high pressure alarm is sounded, all digester input processes are automatically stopped until the digester pressure returns to normal operating conditions. In the event that the digester pressure continues to rise after feeding is stopped, a Varec 5810-B emergency pressure relief valve will decrease the pressure in the digester. The pressure relief valve will be non-mechanical and operate independently from the flare.

Hydrogen Sulfide control to the Engine and Flare

A byproduct of biogas is hydrogen sulfide gas. The facility will implement two control methods to reduce H₂S levels of the biogas to 200 ppm H₂S or less:

- The digester roof is designed with a wooden framework that creates a headspace and surface area for aerobic bacteria to colonize. The process involves the injection of small amounts of air into the digester headspace which allows aerobic bacteria to biologically convert H₂S into elemental sulfur and sulfates which precipitate into the digestate. Oxygen levels in the headspace will be maintained at 0.2 to 4%.
- Hydrogen sulfide levels entering the CHP engine and/or back-up flare will be continuously monitored and recorded by a SCADA system. When H₂S level reach a determined level, ferric chloride will be added to the manure pit at the correct dosage to convert the hydrogen sulfide to ferric sulfate which is precipitated into the digestate.⁴

Best Available Control Technology (BACT) Determination

The new anaerobic digester system, CHP generator set, and associated gas back-up flare will operate in accordance with MassDEP guidance entitled Current Best Available Control Technology Requirements for air emissions from digester-gas-to-electricity operations at Massachusetts farms (dated June 29, 2010) as reflected in Table 2, Operational, Production, and

⁴ Barway Biogas will submit a final Standard Operation and Maintenance Procedures (SOMP) for the H₂S controls to MassDEP within 180 days of startup of the anaerobic digester system (see Table 6, Provision 6). The SOMP shall describe the final set points for the initiation of the ferric chloride dosing process. It shall also describe the conditions under which the digester will be shut down as well as describe the process of emergency shutdown.

Emission Limitations. Particulate matter (PM) emissions from the CHP engine were determined to be negligible and so emission limits for this emission unit are not included in Table 2.

The facility will follow maintenance requirements and conduct initial and periodic performance testing on the CHP engine.

Applicable Regulatory Requirements

In addition to being subject to the BACT requirements of 310 CMR 7.02(8)(a)2, the proposed operations are subject to the visible emission requirements of 310 CMR 7.06, the dust, odor, construction and demolition requirements of 310 CMR 7.09 and the noise reduction requirements of 310 CMR 7.10.

The Permittee has stated that the facility may be subject to 40 CFR Part 60, Subpart JJJJ, Standards of Performance for Stationary Spark Ignition Internal Combustion Engines and 40 CFR Part 63, Subpart ZZZZ, National Emission Standard for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines. Since MassDEP has not accepted delegation for Subpart JJJJ and Subpart ZZZZ for sources which are not subject to 310 CMR Appendix C, the Permittee is advised to consult with EPA Region 1 at 5 Post Office Square, Suite 100, Boston, MA 02109-3912, telephone: (617)918-1111. Other applicable requirements may include notification, record keeping, and reporting requirements.

2. EMISSION UNIT IDENTIFICATION

Each Emission Unit (“EU”) identified in Table 1 is subject to and regulated by this Plan Approval:

Table 1			
EU	Description	Design Capacity	Pollution Control Device (PCD)
1	Receiving Tank (Hydrolyzer)	<ul style="list-style-type: none"> 66,000 gallon 	H ₂ S/Odor Control: <ul style="list-style-type: none"> newterra model NT-DBS-700 CFM (or equivalent) filter housing unit; Filter Innovations, Inc. (or equivalent) with KOH impregnated activated carbon.
2	Anaerobic Digester	<ul style="list-style-type: none"> 396,000 gallon 	H ₂ S Control: <ul style="list-style-type: none"> Air injection in headspace of EU; Ferric chloride addition.
3	Dresser-Rand Guascor HGM 240 (or equivalent) CHP generator set	<ul style="list-style-type: none"> 500 kW electrical output 4.4 MMBtu/hr maximum heat input 	CO control: <ul style="list-style-type: none"> DCL America, Inc. MQL DC18-10 CC (or equivalent) oxidation catalyst. Noise: <ul style="list-style-type: none"> Ventilation Direct belt drive centrifugal upblast exhaust fan; GT Exhaust Systems, Inc. exhaust silencer; Noise-mitigating container.
4	LSC Environmental Products, LLC CF-10 (or equivalent) biogas flare	<ul style="list-style-type: none"> 5.4 MMBtu/hr heat input capacity; 8-inch diameter flare head 	N/A
5	(2) - Digestate Storage Lagoons	<ul style="list-style-type: none"> 1,000,000 gallon, each 	N/A

Table 1 Key:

EU = Emission Unit Number
 CHP = combined heat and power
 kW = kilowatt
 N/A = Not applicable
 Btu/hr = British thermal units

PCD = Pollution Control Device
 H₂S = Hydrogen sulfide
 CO = Carbon monoxide
 KOH = Potassium hydroxide

3. APPLICABLE REQUIREMENTS

A. OPERATIONAL, PRODUCTION and EMISSION LIMITS

The Permittee is subject to, and shall not exceed the Operational, Production, and Emission Limits as contained in Table 2:

Table 2			
EU	Operational / Production Limit	Air Contaminant	Emission Limit ¹
3	1. Daily average concentration of H ₂ S shall be less than or equal to 200 ppm _v entering the CHP engine. 2. Oxidation catalyst to reduce CO emissions by at least 90% (by weight).	NO _x	1.8 lbs/MW-hr; 4.03 TPY 0.8 TPM
		CO	0.68 lbs/MW-hr; 1.5 TPY 0.3 TPM
		VOC	1.05 lbs/MW-hr; 2.3 TPY 0.46 TPM
		SO ₂	0.55 lb/MW-hr; 1.2 TPY 0.24 TPM
		Opacity ²	< 5%, EXCEPT 5 TO < 10% FOR ≤ 2 MINUTES DURING ANY ONE HOUR
		Smoke	310 CMR 7.06(1)(a)

Table 2			
EU	Operational / Production Limit	Air Contaminant	Emission Limit ¹
4	3. ≤ 365 hours per year of operation. 4. Daily average concentration of H ₂ S shall be less than or equal to 200 ppm _v entering the back-up flare. 5. 98 % hydrocarbon destruction.	NO _x	0.21 lbs/hr; 0.04 TPY 0.01 TPM
		CO	0.89 lbs/hr; 0.16 TPY 0.03 TPM
		VOC	0.75 lbs/hr; 0.14 TPY 0.03 TPM
		PM/PM ₁₀ /PM _{2.5}	0.09 lbs/hr; 0.016 TPY 0.003 TPM
		SO ₂	0.27 lb/hr; 0.05 TPY 0.01 TPM
		Opacity ²	< 5%, EXCEPT 5 TO < 10% FOR ≤ 2 MINUTES DURING ANY ONE HOUR
		Smoke	310 CMR 7.06(1)(a)
Facility-wide	-	NO _x	4.07 TPY 0.81 TPM
		CO	1.66 TPY 0.33 TPM
		VOC	2.44 TPY 0.49 TPM
		SO ₂	1.25 TPY 0.25 TPM

Table 2 Key:

EU = Emission Unit Number

TPY = tons per consecutive 12-month period²

TPM = tons per month

CO = Carbon Monoxide

NO_x = Nitrogen Oxides

CO₂ = Carbon Dioxide

H₂S = Hydrogen sulfide

SO₂ = Sulfur Dioxide

PM₁₀ = Particulate matter less than or equal to 10 microns in diameter

VOC = Volatile Organic Compounds

PPM_v = Part per million by volume

CHP = combined heat and power

≤ = less than or equal to

lbs/MW-hr = pounds per megawatt hour

lbs/hr = pounds per hour

PM = Total Particulate Matter

PM_{2.5} = Particulate matter less than or equal to 2.5 microns in diameter

Table 2 Notes

- (1) NO_x and CO per manufacturer supplied emission factor. VOC and PM emission factors per United States Environmental Protection Agency AP 42 emission factors. CO₂ and SO₂ emission factors per stoichiometric calculation.
- (2) Opacity means that characteristic of matter which renders it capable of interfering with the transmission of rays of light and causes a degree of obscuration of an observer's view.
- (3) To calculate the amount of a consecutive 12 month rolling period take the current calendar month amount and add it to the previous 11 calendar months total amount.

B. COMPLIANCE DEMONSTRATION

The Permittee is subject to, and shall comply with, the monitoring, testing, record keeping, and reporting requirements as contained in Tables 3, 4, and 5:

Table 3	
EU	Monitoring and Testing Requirements
1	1. The Permittee shall install sampling ports at the inlet and outlet of the Filter Innovations, Inc. activated carbon filter.
	2. The Permittee shall monitor the Filter Innovations, Inc. activated carbon filter for breakthrough weekly. When breakthrough has occurred, the Permittee shall install new activated carbon media. If at the end of 120 days of operation no measurement of breakthrough is recorded, the Permittee may request a written approval from MassDEP allowing a modified schedule for breakthrough monitoring. This request shall be made in writing to MassDEP and shall include a demonstration that the capacity of the filter is sufficient for the requested monitoring schedule.
2	3. The Permittee shall monitor the oxygen (O ₂) content weekly in EU 2 to ensure that the amount of O ₂ measured in the cleaned biogas averages between 0.2 and 4% by volume.
	4. To document compliance status with the emission limitations contained in Table 2 above, biogas samples from EU 2 shall be analyzed every 30 minutes for methane, carbon dioxide, oxygen and hydrogen sulfide content using a continuous monitoring and SCADA system. Set points for addition of ferric chloride to the manure pit to reduce H ₂ S concentrations in the biogas shall be established and updated in the facility's SOMP (per Table 6, Provision 6) once the system parameters have been established.
	5. The Permittee shall install a Varec 5810-B (or equivalent) emergency pressure relief valve to activate if the pressure within EU 2 reaches 5 inches of water column. An audible and visual alarm shall alert the operator of the elevated pressure event.

Table 3	
EU	Monitoring and Testing Requirements
	6. In the event that the Varec 5810-B (or equivalent) emergency pressure relief valve is activated, the Permittee shall monitor on a weekly basis, using Audio-Visual-Olfactory (AVO) inspection methods, the said valve for leaks.
3	7. The Permittee shall conduct emissions testing for NO _x , CO, VOC, and SO ₂ within 90 days of the commencement of continuous operation and conduct subsequent performance testing every 8,760 hours or 3 years, whichever comes first, thereafter to demonstrate compliance. Additionally, emission testing shall be conducted by the Permittee at MassDEP request. All compliance testing shall be conducted in accordance with the test methods and procedures set forth in 310 CMR 7.13, 40 CFR 60, Appendix A and 40 CFR 60.4244. All compliance testing shall be scheduled with MassDEP personnel at a mutually agreeable date and time. The Permittee shall submit a test protocol for the required emission test for review and MassDEP approval at least 30 days prior to the anticipated date of testing. The Permittee shall submit the emission test results report to MassDEP's WERO within 60 days of completion of the compliance stack testing.
	8. For compliance testing purposes, this EU shall be constructed so as to accommodate the emissions testing requirements as stipulated in 310 CMR 7.13, 40 CFR Part 60, Appendix A and 40 CFR 60.4244. The two (2) inlet and two (2) outlet sampling ports shall be located at two duct diameters upstream and eight duct diameters downstream of any flow disturbance. The corresponding sampling ports shall be 90 degrees apart from each other. Any variation in sampling port position requires MassDEP approval.
	9. To document compliance status with the emission limitations contained in Table 2 above, the Permittee shall monitor the following on a daily, monthly, and twelve month rolling basis: <ul style="list-style-type: none"> a. the biogas consumption of the CHP engine; b. the number of hours of operation of the CHP engine (per monthly and 12 consecutive month periods) through a non-resettable hour meter; c. electrical output (kW) of the CHP engine.
3, 4	10. If and when MassDEP requires it, the Permittee shall conduct opacity (40 CFR 60 Appendix A, Method 9) and/or smoke observations (40 CFR 60 Appendix A, Method 22) to determine compliance with the visible emission limits stated in Table 2.
4	11. To document compliance status with the emission limitations contained in Table 2 above, the Permittee shall monitor the following on a daily, monthly, and twelve month rolling basis: <ul style="list-style-type: none"> a. the biogas consumption of the flare; b. number of hours of operation of the flare;
	12. The Permittee shall continuously monitor the presence of the flare pilot flame using a thermocouple or any other device approved by the MassDEP. The monitor shall be connected to the SCADA system and include an audible alarm to alert the operator of the absence of a flame while biogas is routed to the back-up flare.

Table 3	
EU	Monitoring and Testing Requirements
Facility-wide	13. The Permittee shall conduct a noise survey (during daytime and nighttime operation), which is in accordance with MassDEP guidelines, to demonstrate that the noise impacts from the operation of the emission units are in compliance with Regulation 310 CMR 7.10 and the Bureau of Air and Waste Noise Policy No. 90-001 (copy attached). This survey shall be conducted within 45 days of the commencement of continuous operation of these EUs. The noise survey results shall be submitted to MassDEP's WERO, in writing, attention BAW Permit Chief, within 30 days of the completion of testing.
	14. The Permittee shall monitor all operations to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.

Table 3 Key:

EU = Emission Unit Number	CHP = combined heat and power
VOC = Volatile Organic Compounds	kW = kilowatt
CO = Carbon Monoxide	% = percent
NO _x = Nitrogen Oxides	CFR = Code of Federal Regulations
CO ₂ = Carbon Dioxide	WERO = Western Regional Office
H ₂ S = Hydrogen sulfide	SCADA = supervisory control and data acquisition system
SO ₂ = Sulfur Dioxide	USEPA = United States Environmental Protection Agency
MassDEP = Massachusetts Department of Environmental Protection	
SOMP = Standard Operating and Maintenance Procedure	

Table 4	
EU	Record Keeping Requirements
1	1. The Permittee shall record the date, time, and delivery amount of SSO and DAF material as well as sign off that the activated carbon system for EU 1 was utilized properly prior to feeding the SSO and DAF to EU 1 (blower fan was activated prior to filling). This information shall be recorded in a logbook, or similar record keeping system, that shall be maintained near EU 1.
	2. The Permittee shall maintain on-site documentation of: <ul style="list-style-type: none"> a. weekly records on the breakthrough condition of the activated carbon system; b. any replacement of the activated carbon media; c. total downtime of the system due to media replacement and/or maintenance.
2	3. The Permittee shall maintain weekly on-site records of the oxygen (O ₂) content in EU 2 headspace.
	4. The Permittee shall maintain monthly on-site records of any instances when the ferric chloride system for H ₂ S control is implemented.

Table 4	
EU	Record Keeping Requirements
2	5. The Permittee shall maintain onsite records of any pressure relief valve releases to atmosphere required pursuant to Table 3 of this Plan Approval or is otherwise necessary.
2, 3, 4	6. The Permittee shall maintain daily on-site records of the maximum, minimum, and average hydrogen sulfide concentrations (in ppm by volume) exiting EU 2 before the biogas is combusted in either EU 3 or EU 4 to document compliance with the emission limitations contained in Table 2 above.
3, 4	7. The Permittee shall maintain on-site records of the daily, monthly, and twelve month rolling biogas consumption for EU 3 and EU 4 and the electrical output for EU 3 to document compliance with the emission limitations contained in Table 2 above.
4	8. The Permittee shall maintain onsite monthly records of the number of hours of back-up flare operation.
Facility-wide	9. The Permittee shall quantify all periods of excess emissions, even if attributable to an emergency/malfunction, startup/shutdown or equipment cleaning in the determination of annual emissions and compliance with the emission limits as stated in Table 2.
	10. The Permittee shall maintain a record keeping system for these EUs to be established on-site. All such records shall be maintained up-to-date such that year-to-date information is readily available for MassDEP examination upon request and shall be kept on site for a minimum of five (5) years. Record keeping shall, at a minimum, include: <ul style="list-style-type: none"> a) Compliance records sufficient to document that the actual monthly and twelve month rolling emission rates of NO_x, CO, VOC, total PM, SO₂, and H₂S from each EU are in compliance with the emission limitations contained in Table 2 above. Such records shall include, but are not limited to, the daily, monthly, and twelve month rolling biogas consumption rates for each applicable EU, emissions test results, monitoring equipment data and reports, and hours of operation. b) Maintenance: A record of routine maintenance activities performed on these EUs and their monitoring equipment including, at a minimum, the type or a description of the maintenance performed and the date and time the work was completed. c) Malfunctions: A record of all malfunctions of these EUs and their monitoring equipment including, at a minimum: the date and time the malfunction occurred; a description of the malfunction and the corrective action taken; the date and time corrective actions were initiated; and the date and time corrective actions were completed and the equipment was returned to compliance.
	11. The Permittee shall maintain adequate records on-site to demonstrate compliance status with all operational, production, and emission limits contained in Table 2 above. Records shall also include the actual emissions of air contaminant(s) emitted for each calendar month and for each consecutive twelve-month period (current month plus prior eleven months). These records shall be compiled no later than the 15 th day following each month. An electronic version of the MassDEP approved record keeping form, in Microsoft Excel format, can be downloaded at: http://www.mass.gov/eea/agencies/massdep/air/approvals/limited-emissions-record-keeping-and-reporting.html#WorkbookforReportingOn-SiteRecordKeeping .
	12. The Permittee shall maintain records of monitoring and testing as required by Table 3.
	13. The Permittee shall maintain a copy of all noise survey results on-site.

Table 4	
EU	Record Keeping Requirements
Facility-wide	14. The Permittee shall maintain a copy of this Plan Approval, underlying Application and the most up-to-date SOMP for the EU(s) and PCD(s) approved herein on-site.
	15. The Permittee shall maintain records to ensure sufficient information is available to comply with 310 CMR 7.12 Source Registration.
	16. The Permittee shall make records required by this Plan Approval available to MassDEP and USEPA personnel upon request.

Table 4 Key:

EU = Emission Unit Number
 SOMP = Standard Operating and Maintenance Procedure
 SSO = Source separated organics
 DAF = Dissolved air flotation

PCD = Pollution Control Device
 USEPA = United States Environmental Protection Agency
 MassDEP = Massachusetts Department of Environmental Protection

Table 5	
EU	Reporting Requirements
3	1. The Permittee shall submit a compliance test protocol for the required initial and subsequent compliance tests to MassDEP's WERO for review and approval at least 30 days prior to the scheduled commencement of said testing.
	2. The Permittee shall submit the initial emission test results report and all subsequent emission tests to WERO for review within 60 days of the completion of any required compliance stack testing.
Facility-wide	3. The Permittee shall notify WERO, in writing, within 14 days of commencement of continuous operation of this EU.
	4. The noise survey results shall be submitted to WERO, in writing, attention BAW Permit Chief, within 75 days of the commencement of continuous operation of these EUs.
	5. The Permittee shall submit the Final Standard Operating and Maintenance Procedures (SOMP) for these EUs to WERO within 60 days of completion of their required initial compliance testing. Any subsequent changes to the SOMP shall be submitted to WERO, within 15 days of said revision(s).
	6. The Permittee shall notify MassDEP's WERO by telephone, fax, or email as soon as possible, but in any case no later than one business day, and subsequently in writing within seven days, after the occurrence of any upsets or malfunctions to these EUs and related equipment, including but not limited to activation of the pressure release valve on EU 2, which results in an excess emission to the air and/or a condition of air pollution.

Table 5	
EU	Reporting Requirements
Facility-wide	<p>7. All notifications and reporting required and not specified by this Approval shall be made to:</p> <p>Department of Environmental Protection/Bureau of Air and Waste 436 Dwight Street Springfield, Massachusetts 01103 ATTN: BAW Permit Chief Phone: 413-784-1100 Fax: 413-784-1149</p>
	<p>8. The Permittee shall submit to MassDEP all information required by this Plan Approval over the signature of a “Responsible Official” as defined in 310 CMR 7.00 and shall include the Certification statement as provided in 310 CMR 7.01(2)(c).</p>
	<p>9. The Permittee shall notify the Western Regional Office of MassDEP, BAW Section Chief by telephone: 413-755-2115, email: marc.simpson@state.ma.us, or fax : 413-784-1149, as soon as possible, but no later than three (3) business days after discovery of an exceedance(s) of Table 2 requirements. A written report shall be submitted to Section Chief at MassDEP within ten (10) business days thereafter and shall include: identification of exceedance(s), duration of exceedance(s), reason for the exceedance(s), corrective actions taken, and action plan to prevent future exceedance(s).</p>
	<p>10. The Permittee shall report every three years to MassDEP, in accordance with 310 CMR 7.12, all information as required by the Source Registration/Emission Statement Form. The Permittee shall note therein any minor changes (under 310 CMR 7.02(2)(e), 7.03, 7.26, etc.), which did not require Plan Approval.</p>
	<p>11. The Permittee shall provide a copy to MassDEP of any record required to be maintained by this Plan Approval within 30-days from MassDEP’s written request.</p>

Table 5 Key:

EU = Emission Unit Number
 MassDEP = Massachusetts Department of
 Environmental Protection
 WERO = Western Regional Office
 BAW =Bureau of Air and Waste

CMR = Code of Massachusetts Regulations
 H₂S = Hydrogen sulfide
 SOMP = Standard Operating and Maintenance
 Procedures

4. SPECIAL TERMS AND CONDITIONS

A. The Permittee is subject to, and shall comply with, the Special Terms and Conditions as contained in Table 6 below:

Table 6	
EU	Special Terms and Conditions
1	1. The Permittee shall monitor daily the amount of source separated organics (SSO) received.
	2. The Permittee personnel shall be trained in the proper operation of the activated carbon system.
	3. The Permittee shall ensure that the blower fan is running before adding liquid or solid SSO or during any tank filling activities.
	4. The Permittee shall minimize the amount of time that the inlet to the solid addition chute is left open.
	5. The Permittee shall keep replacement media on-site at all times to ensure continuous treatment of the receiving tank displaced gas.
1, 2	6. The Permittee shall submit a standard operating and maintenance procedure for the Filter Innovations, Inc. activated carbon system and the ferric chloride H ₂ S control systems to MassDEP's WERO, ATTN: BAW Permit Chief within 180 days of startup of the anaerobic digester system. This plan shall, at a minimum, include the following information: <ul style="list-style-type: none"> a. Location and specifications of each system, including materials of construction; b. A description of how each system will be operated and maintained, including a schedule for routine maintenance and material replacement; c. Key operating parameter value(s) or range(s); d. A description of how each system's key operating parameters will be monitored and recorded and how corrective actions will be performed; e. A description of any periodic sampling or testing performed on each system; f. A description of how any system malfunctions will be reported to the MassDEP.
3	7. The Permittee shall, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions.
	8. EU 3 shall be equipped with a GT Exhaust Systems, Inc. (or equivalent) exhaust silencer and a Ventilation Direct (or equivalent) upblast exhaust fan. In addition, the CHP engine shall be installed within a container designed for noise suppression.
	9. The Permittee shall operate the subject EUs consistent with the Final SOMP and the conditions/parameters established during the initial compliance test.
	10. The Permittee shall contract the maintenance and servicing of the CHP engine to ensure that a full inventory of spare parts for the CHP engine shall be kept onsite or at an offsite location for use within two hours of the facility.

Table 6	
EU	Special Terms and Conditions
4	11. In the event that the pressure relief valve installed on EU 2 is activated at a greater frequency than originally designed, the Permittee shall reassess the required back-up flare capacity and propose a new, upgraded flare design. This request shall be made in writing to MassDEP and shall include a demonstration that the capacity of the new back-up flare will be sufficient to control biogas emissions.
	12. The Permittee shall design the back-up flare (positioning, etc.) or otherwise equip the flare to provide protection to raptors. Specifications shall be included in the facility's SOMP document.
Facility-wide	13. A log of all odor complaints and response to the complaint shall be kept onsite for tracking purposes and to assure that action is taken to address the issue. The facility's current <i>Progressive Odour Management Plan</i> shall be kept on-site at all times.
	14. A log of all noise complaints and response to the complaint shall be kept onsite for tracking purposes and to assure that action is taken to address the issue.

Table 6 Key:

EU = Emission Unit Number
 WERO = Western Regional Office
 CFR = Code of Federal Regulations
 USEPA = United States Environmental Protection Agency
 H₂S = Hydrogen Sulfide

MassDEP = Massachusetts Department of Environmental Protection
 BAW = Bureau of Air and Waste
 SOMP = Standard Operating and Maintenance Procedures

- B. The Permittee shall install and use an exhaust stack, as required in Table 7, on each of the Emission Units that is consistent with good air pollution control engineering practice and that discharges so as to not cause or contribute to a condition of air pollution. Each exhaust stack shall be configured to discharge the gases vertically and shall not be equipped with any part or device that restricts the vertical exhaust flow of the emitted gases, including, but not limited to, rain protection devices known as “shanty caps” and “egg beaters.”
- C. The Permittee shall install and utilize exhaust stacks with the following parameters, as contained in Table 7, for the Emission Units that are regulated by this Plan Approval:

Table 7				
EU	Stack Height Above Ground (feet)	Stack Inside Exit Dimensions (feet)	Stack Gas Exit Velocity Range (feet per second)	Stack Gas Exit Temperature Range (°F)
3	29	0.75	55.5	912
4	21	0.5	0.06 – 1.7	1,273

Table 7 Key:

EU= Emission Unit Number

°F = Degree Fahrenheit

5. GENERAL CONDITIONS

The Permittee is subject to, and shall comply with, the following general conditions:

- A. Pursuant to 310 CMR 7.01, 7.02, 7.09 and 7.10, should any nuisance condition(s), including but not limited to smoke, dust, odor or noise, occur as the result of the operation of the Facility, then the Permittee shall immediately take appropriate steps including shutdown, if necessary, to abate said nuisance condition(s).
- B. If asbestos remediation/removal will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that all removal/remediation of asbestos shall be done in accordance with 310 CMR 7.15 in its entirety and 310 CMR 4.00.
- C. If construction or demolition of an industrial, commercial or institutional building will occur as a result of the approved construction, reconstruction, or alteration of this Facility, the Permittee shall ensure that said construction or demolition shall be done in accordance with 310 CMR 7.09(2) and 310 CMR 4.00.
- D. Pursuant to 310 CMR 7.01(2)(b) and 7.02(7)(b), the Permittee shall allow MassDEP and / or USEPA personnel access to the Facility, buildings, and all pertinent records for the purpose of making inspections and surveys, collecting samples, obtaining data, and reviewing records.
- E. This Plan Approval does not negate the responsibility of the Permittee to comply with any other applicable Federal, State, or local regulations now or in the future.
- F. Should there be any differences between the Application and this Plan Approval, the Plan Approval shall govern.
- G. Pursuant to 310 CMR 7.02(3)(k), MassDEP may revoke this Plan Approval if the construction work is not commenced within two years from the date of issuance of this Plan Approval, or if the construction work is suspended for one year or more.
- H. This Plan Approval may be suspended, modified, or revoked by MassDEP if MassDEP determines that any condition or part of this Plan Approval is being violated.
- I. This Plan Approval may be modified or amended when in the opinion of MassDEP such is necessary or appropriate to clarify the Plan Approval conditions or after consideration of a written request by the Permittee to amend the Plan Approval conditions.

- J. Pursuant to 310 CMR 7.01(3) and 7.02(3)(f), the Permittee shall comply with all conditions contained in this Plan Approval. Should there be any differences between provisions contained in the General Conditions and provisions contained elsewhere in the Plan Approval, the latter shall govern.

6. MASSACHUSETTS ENVIRONMENTAL POLICY ACT

MassDEP has determined that the filing of an Environmental Notification Form (ENF) with the Secretary of Energy & Environmental Affairs, for air quality control purposes, was not required prior to this action by MassDEP. Notwithstanding this determination, the Massachusetts Environmental Policy Act (MEPA) and 301 CMR 11.00, Section 11.04, provide certain "Fail-Safe Provisions," which allow the Secretary to require the filing of an ENF and/or an Environmental Impact Report (EIR) at a later time.

7. APPEAL PROCESS

This Plan Approval is an action of MassDEP. If you are aggrieved by this action, you may request an adjudicatory hearing. A request for a hearing must be made in writing and postmarked within twenty-one (21) days of the date of issuance of this Plan Approval.

Under 310 CMR 1.01(6)(b), the request must state clearly and concisely the facts, which are the grounds for the request, and the relief sought. Additionally, the request must state why the Plan Approval is not consistent with applicable laws and regulations.

The hearing request along with a valid check payable to the Commonwealth of Massachusetts in the amount of one hundred dollars (\$100.00) must be mailed to:

Commonwealth of Massachusetts
Department of Environmental Protection
P.O. Box 4062
Boston, MA 02211

This request will be dismissed if the filing fee is not paid, unless the appellant is exempt or granted a waiver as described below. The filing fee is not required if the appellant is a city or town (or municipal agency), county, or district of the Commonwealth of Massachusetts, or a municipal housing authority.

MassDEP may waive the adjudicatory hearing-filing fee for a person who shows that paying the fee will create an undue financial hardship. A person seeking a waiver must file, together with the hearing request as provided above, an affidavit setting forth the facts believed to support the claim of undue financial hardship.

Barway Biogas, LLC
March 6, 2015 - Plan Approval
Transmittal No. X262954
Application No. WE-14-025
Page 21 of 21

Should you have any questions concerning this Plan Approval, please contact Amy Stratford by telephone at 413-755-2144, or in writing at the letterhead address.

This final document copy is being provided to you electronically by the
Department of Environmental Protection. A signed copy of this document
is on file at the DEP office listed on the letterhead.

Marc Simpson
Section Chief
Bureau of Air and Waste

Enclosure

ecc: MassDEP/Boston - Yi Tian
Claire Allen, P. Eng, CH Four Biogas, Inc.